Diesel Emissions Reduction Program Options: Examples from Texas and California

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Background

- Diesel particulate matter (PM) has been classified as a probable human carcinogen.
- Diesel powered vehicles are major sources of oxides of nitrogen (NOx), a contributor to Smog.
- Controlling both PM and NOx from diesels is possible, but presents challenges.
- The states of California and Texas have implemented programs to reduce NOx and PM from diesels.

Texas Diesel Programs

- Diesel Inspection/Maintenance (I/M) Program Study
- Texas Emissions Reduction Plan (TERP)

Texas Diesel I/M Study
Major Findings

- Diesel I/M programs currently aim to reduce particulate matter (PM) emissions.
- There are no programs in place to reduce NOx emissions.

Texas Diesel I/M Study Major Findings

- Many engines built since 1990 have a design defect that increases NOx emissions during highway operation.
  - To correct this problem, heavy-duty diesel engine manufacturers agreed to make available for no cost reprogramming kits to retard the timing during highway operation, thereby reducing NOx emissions.
  - Substantial NOx emission reductions are possible from identifying vehicles that have not yet been reprogrammed.

Texas Diesel I/M Study Major Findings

- OBDII system checks should provide significant benefits on vehicles equipped with these systems:
  - Currently, 1997 and newer model light-duty diesel powered vehicles (less than 8,500 lbs. GVW) are equipped with OBDII systems. ***These vehicles are tested in Connecticut.***
  - Beginning in model year 2005, vehicles with gross vehicle weights between 8,500 and 14,000 lbs are required to be equipped with OBDII systems, and heavy-duty engines will be required to be equipped with OBDII systems beginning approximately with the 2008 model year.

Texas Emissions Reduction Plan (TERP) Program Elements Related to Diesels

- **Emissions Reduction Incentive Grants Program.** Eligible projects include new purchases, replacements, re-powers, retrofit technologies, infrastructures, and qualifying fuels.
- **Heavy-Duty Motor Vehicle Purchase or Lease Incentive Program.** This is a TCEQ rebate program for the purchase or lease of cleaner heavy-duty (10,000 lbs) vehicles.
- **New Technology Research and Development Program (NTRD).** Identifying, supporting, and evaluating new environmental technologies.
- Emphasis is on reducing NOx emissions. Cost-effectiveness cap is $7,000/ton of NOx reduced.

Texas Emissions Reduction Plan (TERP) Emissions Reduction Incentive Grants Program

- Over 100 projects funded, for a total of $42,457,507 (FY02 through FY04 1st Round).
  - Projected NOx emission reductions are 7,541 tons, or 4.1 tons per day in 2007.
  - Projected average cost per ton is $5,630.
- Additional projects will total $71.9 million:
  - Projected NOx reductions of 11,825 Tons or 7.82 tons per day in 2007.
  - Projected average cost of these projects is $6,081 per ton of NOx reduced.

Texas Emissions Reduction Plan (TERP) New Technology Research and Development Program

- 16 projects were selected for funding in FY2004:
  - 7 projects for retrofit/add-on devices for existing engines/vehicles;
  - 7 projects for advanced technologies for new engines/vehicles (3 hybrid electric projects, 1 fuel cell project, and 3 fuel additive projects);
- Total cost is $8,301,448.
- Estimated NOx reductions are approximately 1,200 tons (based on cap of $7,000/ton NOx).

California's Carl Moyer Program: Incentives for Lower-Emission from Heavy-Duty Engines

- California established the Carl Moyer Program to identify and implement cost-effective controls for Heavy-Duty Engines.
- Administered by the Air Resources Board (ARB) and local and regional air pollution control districts, the program funds emission reductions that are not already required by statute, rule, order, or regulation.
- Emphasis is on NOx and PM controls.

The Carl Moyer Program: Eligible Projects

- Cleaner heavy-duty vehicles and equipment in the following categories:
  - On-road motor vehicles over 14,000 pounds gross vehicle weight rating
  - Off-road equipment over 50 horsepower
  - Marine vessels
  - Auxiliary power units
  - Locomotives
  - Stationary agricultural pump engines
  - Forklifts
  - Airport ground support equipment

The Carl Moyer Program: Eligible Projects

- Emission reduction equipment:
  - After-treatment systems (e.g., diesel particulate traps)
  - Idle reduction devices and
  - Alternative fuels

The Carl Moyer Program: Cost-Effectiveness Criteria

- The current cost-effectiveness limit is $13,600 per ton of NOx reduced.
- In the first four years of the program, cost-effectiveness has averaged less than $3,000 per ton of NOx reduced.

The Carl Moyer Program: Emissions Reductions

- Heavy-duty engine projects funded during the first four years of the program reduced NOx emissions by about 14 tons per day.
- These projects also reduce diesel particulate matter (PM) by an estimated 1 ton per day.
- The NOx and diesel PM emission benefits will continue for at least five years (the minimum project life).
- Some large engine projects involving locomotives or marine vessels continuing to provide lower emissions for 20 years or more.

Conclusions

- Connecticut can draw on programs in TX and CA to identify cost-effective control strategies for diesels.
- Connecticut could significantly reduce PM and NOx emissions from diesels by the following:
  - Inspections of diesel powered vehicles
  - Promoting cost-effective engine replacements
  - Promoting cost-effective emissions control technologies.

More Information

- **THE CARL MOYER PROGRAM: ANNUAL STATUS REPORT**
  - **The Carl Moyer Memorial Air Quality Standards Attainment Program: Incentives for Lower-Emission Heavy-Duty Engines**
  - **February 2004**
- **Texas Emissions Reduction Plan: Biennial Report to the Texas Legislature**
  - **December 2004**